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## Tachometers

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**About Al-Tek® Tachometers**

Not all tachometers are the same, and this is certainly true of the Al-Tek Instruments tachometry line. Designed with severe industrial environments in mind, these units will provide reliable around-the-clock operation for years under adverse conditions.

Al-Tek Instruments is a leader in manufacturing this type of instrument. Our prices reflect the design, quality, ruggedness and engineering of the equipment. What you really get with Al-Tek Instruments is a superb price performance ratio. It may not initially be the least expensive equipment available; but, in the long run, the value of this equipment is that it will outperform and outlast others.

**Introduction of the New Generation Tachometer Line**

The new generation TACHPAK and TACHTROL series tachometers have been designed with all of the functions and durability embodied in the previous tachometer series as well as improvements to extend performance, accuracy and function. With the exception of the Tachtrol 20, both TACHPAK and TACHTROL now share a common processing platform. This commonality allows both to perform identical tachometry functions, streamlines programming and minimizes the learning curve. The main physical difference between the two is the characteristic integrated display function found in all TACHTROL series tachometers.

**Common Specifications:**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>-10°C to +55°C operating; -40°C to +80°C storage</td>
</tr>
<tr>
<td>Thermal Cycle</td>
<td>50 cycles: -40°C to +80°C; 200 cycles: -10°C to +55°C</td>
</tr>
<tr>
<td>Humidity</td>
<td>90% RH non-condensing per IEC 654-1, IEC 68-2-3</td>
</tr>
<tr>
<td>Vibration</td>
<td>MIL-STD-810C Environmental Test Methods, method 514.2, procedure VIII, figure 514.2-6, curve V; 1.5g’s 10-2000 Hz, 5.5 hrs./axis, 3 axis IEC 60068-2-6, 10-150Hz, 2g, 10 sweep cycles / axis, 3 axis</td>
</tr>
<tr>
<td>Shock</td>
<td>MIL-STD-810C Environmental Test Methods, method 516.2, procedure I and figures 516.2-2, for ground equipment; 30g’s half sine, 11ms. 3 axis, 18 total IEC 60068-2-27; 50g half sine, 11ms, 3 axis, 18 total</td>
</tr>
<tr>
<td>RoHS</td>
<td>RoHS compliant per European Directive 2002/95/EC</td>
</tr>
</tbody>
</table>

**Support Documents On Website Include:** TACHLINK, Manual, Tach Training Video

**Tach Package Contents:**

- TACHPAK 10 & 30 and TACHTROL 10 & 30 are shipped in a single carton containing one instrument, TACHLINK, a manual on CD ROM, and a USB cable.
- TACHTROL plus is shipped in a single carton containing one instrument and a display cable with RJ-11 terminations. TACHTROL 10 & 30 and TACHTROL plus Explosion Proof and NEMA 4X are shipped in a single carton containing one instrument and accessories as described above, one infrared remote and one DIN rail mounting kit.
- TACHPAK 10 & 30 Explosion Proof and NEMA 4X are shipped in a single carton containing one rated enclosure and one instrument and accessories as described above.

*It is the customer’s responsibility to determine whether the product is proper for customer’s use and application. The information contained herein is subject to change without notice. Refer to the factory for verification of any details.*
Specifications (Continued):

**Electrical**
All measurements taken at 25°C unless otherwise specified.

**Input Power**

**Power consumption**
3.5 watts, typical for tachometer only
Add 0.5 watts per remote display
Add 2.0 watts for 12V out
9.5 watts max.

**DC Voltage**

**AC Voltage**
80-264 Vac 50-60 Hz

**Power Sharing**
If DC input and AC input are both supplied, DC will be loaded above approximately 15 volts. Below 15Vdc input, AC will be loaded.

**Output Power**
Regulated to 12 volts @ 150mA when input voltage is 13.6 volts and above. Below 13.6 volts, output voltage ≈ input voltage – 1.5V.

**Input Signal Characteristics**

**Channel A & B**

**Frequency**
Upper Limit: 50 kHz absolute maximum (20μsec period); 40kHz typical
Lower Limit: 0.005 Hz absolute minimum (200 sec. period); .05 Hz typical
Minimum Pulse Width: 0.5 μsec.
Wave shape: Square or Sinusoidal

**Input Impedance**
12 kΩ typical

**Input Sensitivity**
Upper and Lower Limit: +/-30 volts max. (AC or DC).
Logic 0 and Logic 1 thresholds are user adjustable from 200mV to +28 volts in approx. 20mV steps +/-3%.
200mV peak absolute min. input sensitivity.

**Common Mode Rejection Ratio**
>40 db @1kHz typical

**Electrical Isolation**
Channel A, B and Direction share common ground
Direction to output: 500 Vrms
Direction to ground: 500 Vrms

**Verify and Reset**

**Frequency**
Essentially DC, Minimum Pulse Width: 250 μsec.

**Input Impedance**
10mA current regulated

**Input Sensitivity**
3.5 volts min. pulse to ground

**Common Mode Rejection Ratio**
>40 db @ DC typical

**Electrical Isolation**
Signal to signal 500 Vrms
Signal to ground 500 Vrms

**Direction**

**Frequency**
Essentially DC
Minimum Pulse Width: 0.5 μsec.

**Input Impedance**
12 kΩ typical

**Input Sensitivity**
Upper and Lower Limit: +/-30 volts max. (AC or DC).
Logic 0 and Logic 1 thresholds are user adjustable from 0 to 28 volts in approx. 20mV steps +/-3%.

**Common Mode Rejection Ratio**
>40 db @1kHz typical

**Electrical Isolation**
Channel A, B and Direction share common ground
Direction to output: 500 Vrms
Direction to ground: 500 Vrms

**Output Characteristics**

**Relays (Mechanical)**

**Physical**
Form C

**Contact Rating**
10A @ 125/250 Vac, 6A @ 277 Vac, 5A @ 30Vdc, 0.5A @ 100Vdc
2500 VA

**Response Time (operate and release)**
Input to output 16.5 msec max.
(10 msec relay only)

**Electrical Isolation**
1500 Vrms, 1 minute coil to contacts

**Switchpoint Accuracy**
Internal instrument accuracy to alarm setpoint: ±.005%
Relays (Solid State)

**Physical**
Form A

**Contact Rating**
400mA @ 60V (AC or DC)
On resistance: 2Ω max

**Response Time (operate and release)**
Operate: 2 ms max, 0.8 ms typical
Release: 0.5 ms max, 0.1 ms typical

**Electrical Isolation**
500 Vrms, 1 minute

**Switchpoint Accuracy**
Internal instrument accuracy to alarm setpoint: ±.005%

**Analog Output**

**Ranges**
0 to 20mA, 4 to 20mA, -20 to 0 to +20mA; user selectable

**Accuracy**
Internal instrument accuracy: ±.005%; plus ±.05% of full scale range at room temp with 400 ohm load; ±0.1% over temp range and load range. Unit is factory calibrated. Can be re-calibrated using TACHLINK.

**Resolution**
Step size: 610 nanoamps per lsb. 16 bit D/A

**Linearity**
±0.02% typical

**Loop Impedance**
100-1000 Ω

**Response Time**
Input to output 6.55 msec+ 1 msec settle at 1kΩ (worst case) to .1% of final value

**Electrical Isolation**
500 Vrms continuous

**Display (applies to TT & TTplus)**

**Resolution**
Black and White graphics display. 64x128 Pixels.

**Accuracy**
±.05% of full scale

**Communication Protocol**
RS485: 19.2kbaud, 8-n-1 protocol, Half duplex, Tachometer is bus master

Network
- Multiplex up to seven displays plus one integrated display. Displays are addressable.
- With all seven displays at the end of one RJ11 6-4 cable, max length would be 125 ft (38m), limited by voltage drop in cable. Cable must be 1:1 type (not flipped), described as RJ11 6-4 reversed cable. For longer distances the RJ type cable should not be used. With #18 wire max run to a single display is 1000 ft (305m).
- Response time: 1 second update to all displays, PC and RS485

**Electrical Isolation**
500Vrms to ground continuous

**Utility RS485**
Full access to TACHLINK, single drop only

**Communication Protocol**
RS485: 19.2kbaud, 8-n-1 protocol, Half duplex, Tachometer is bus master

**Maximum Transmission Distance**
8000 ft (2400m)

**Electrical Isolation**
500Vrms to ground continuous

**USB**
Full access to TACHLINK, Version 1.1 / 2.0 compatible

**Processing Platform**
PIC18F series micro controller

**Clock Speed**
10MHz, ±50 ppm at room temp

**Acquisition Time**
Basic instrument acquisition time / period 6.55 ms

**Accuracy**
Basic instrument accuracy ±.005% (50 ppm)

**Resolution**
Basic instrument resolution: ±.025% or better
TACHLINK

• TACHLINK is a Windows-based program developed to simplify programming, communication and monitoring with the new generation of AI-TEK tachometers via USB2.0 or RS485.

• Programming is much faster and simpler with TACHLINK.

• Tachometer configuration databases can be stored, backed up and retrieved easily. A stored database can be used to program multiple tachometers and can be e-mailed to remote locations.

• The TACHLINK graphical user interface allows any PC to be used as a remote display.

• Analog output calibration is available only through TACHLINK and allows the customer to perform and verify calibration status.

• Plotting function is available only through TACHLINK and allows the customer to monitor a process over time while monitoring speed and relay status. Output is available to be viewed real-time or can be captured and imported into a spreadsheet format for future analysis.
TACHPAK 30 Key Features (T77530):
- Wide range of AC or DC power (12-30 Vdc, 80-264Vac 50-60Hz)
- Greatly improved instrument accuracy, processing speed and response time.
- Frequency, period or counter modes.
- User-defined inputs for logic level, averaging, alarm set points and hysteresis,
- Signal normalization and math functions allow mathematical manipulation of input signals. Results can be displayed along with user-defined units.
- Accepts sinusoidal and square wave inputs as found in variable reluctance and digital output speed sensors.
- Accepts bi-directional sensor inputs and will decode quadrature or direction signal logic.
- 2 solid state relays (fast response time) and 2 mechanical relays (high power)
- Analog output: 0-20mA, 4-20mA, -20-0-(+) 20mA (can be used with bi-directional sensor)
- Two programming methods: Front panel on display or USB2.0 connectivity to PC / Windows-based TACHLINK.
- Utility RS485 communication allows full TACHLINK function over longer distances (up to 8000 ft)
- Drives up to 8 remote displays (TACHTROL plus). A single display can be up to 1000 ft away with a simple RJ11 (phone jack) connection. Longer runs, cable type and number of displays will affect distance.
- Security mode protects unauthorized access for programming or alarm resets (through display or TACHLINK)
- Mounts to DIN rail. Power can be applied through special DIN bus when used with AI-TEK power supply.
- Environmentally hardened for temperature, vibration and shock. EMC / CE compliant to current BS/ EN directives.
- Designed and manufactured compliant with RoHS.

TACHPAK 10 Key Features (T77510):
- Same as TACHPAK 30 but excludes solid state relays, analog output and utility RS485

Programming Features:
- Programming has been greatly simplified and can be accomplished by 2 different methods. Many configurable attributes have been added to improve flexibility and function.

- TACHPAK 10 and 30 can be programmed with the addition of a TACHTROL plus remote display. Programming is accomplished by navigating through a series of nested menus. In the
Programming Features (continued):

case of tachometer instruments embedded in explosion proof or NEMA 4X enclosures, remote access solves the problem of programming by making use of an IR link to allow full front panel control via a hand-held remote.

• TACHLINK®: PC / Windows-based custom software allows the user to program all configurable attributes of TACHPAK by PC via a USB2.0 or RS485 connection. In addition, the PC can be used to display data, perform security functions, diagnostics, analog output calibration and real-time data logging; all available through the TACHLINK.

Applications:

• Fast response overspeed shutdown
• Petrochemical production applications
• Pump or generator alarm
• Low speed switching
• Start-up, over/under speed switching
• Textile production applications
• Machine control
• Paper & pulp production
• Turbine speed control
• Food processing
• Conveyor alarms
• Printing industry
• Metal production
• Mining applications
• Test labs
• Generator set
• Broken or slipping belt drives

<table>
<thead>
<tr>
<th>Ordering P/N</th>
<th>Input Power</th>
<th>Enclosure</th>
<th>Net Weight (lbs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>T77510-10</td>
<td>80-264 Vac/12-30 Vdc</td>
<td>Standard</td>
<td>0.6</td>
</tr>
<tr>
<td>T77510-40</td>
<td>80-264 Vac/12-30 Vdc</td>
<td>NEMA 4X</td>
<td>3.4</td>
</tr>
<tr>
<td>T77510-70</td>
<td>80-264 Vac/12-30 Vdc</td>
<td>Explosion Proof</td>
<td>24.0</td>
</tr>
<tr>
<td>T77530-10</td>
<td>80-264 Vac/12-30 Vdc</td>
<td>Standard</td>
<td>0.7</td>
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<tr>
<td>T77530-40</td>
<td>80-264 Vac/12-30 Vdc</td>
<td>NEMA-4X</td>
<td>3.5</td>
</tr>
<tr>
<td>T77530-70</td>
<td>80-264 Vac/12-30 Vdc</td>
<td>Explosion Proof</td>
<td>24.0</td>
</tr>
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</table>
### Table 2: Connection Information

<table>
<thead>
<tr>
<th>Terminal Block</th>
<th>Pin #</th>
<th>TACHPAK 30</th>
<th>TACHPAK 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remote Display</td>
<td>Use RJ11 type connector. No individual breakout of pins.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>USB</td>
<td>Use USB “B” type connector. No individual breakout of pins.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RS485 DB9 1,5</td>
<td>GND</td>
<td></td>
<td>Not Available</td>
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<tr>
<td>2</td>
<td>Tx -</td>
<td></td>
<td></td>
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<tr>
<td>3</td>
<td>Rx -</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Tx +</td>
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<td>7</td>
<td>Rx +</td>
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<td></td>
</tr>
<tr>
<td>4,8,9</td>
<td>Not Used</td>
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### Table 3: Connection Information

<table>
<thead>
<tr>
<th>Terminal Block</th>
<th>Pin #</th>
<th>TACHPAK 30</th>
<th>TACHPAK 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>TB1 1</td>
<td>Input Com</td>
<td>Input Com</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>A Sig</td>
<td>A Sig</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>B Sig</td>
<td>B Sig</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Direction Input</td>
<td>Direction Input</td>
<td></td>
</tr>
<tr>
<td>TB2 5</td>
<td>Verify -</td>
<td>Verify -</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Verify +</td>
<td>Verify +</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Reset -</td>
<td>Reset -</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Reset +</td>
<td>Reset +</td>
<td></td>
</tr>
<tr>
<td>TB4 9</td>
<td>Analog Out +</td>
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<td>Not Available</td>
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<tr>
<td>10</td>
<td>Analog Shield</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Analog Out -</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Not Used</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TB3 13</td>
<td>In GND</td>
<td>In GND</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>12-30 Volt In</td>
<td>12-30 Volt In</td>
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</tr>
<tr>
<td>15</td>
<td>+12 Vdc Out</td>
<td>+12 Vdc Out</td>
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<tr>
<td>16</td>
<td>Out GND</td>
<td>Out GND</td>
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<tr>
<td>TB5 17</td>
<td>Relay 1 Com</td>
<td>Relay 1 Com</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Relay 1 N.C.</td>
<td>Relay 1 N.C.</td>
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</tr>
<tr>
<td>19</td>
<td>Relay 1 N.O.</td>
<td>Relay 1 N.O.</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Not Used</td>
<td>Not Used</td>
<td></td>
</tr>
<tr>
<td>TB6 21</td>
<td>Relay 2 Com</td>
<td>Relay 2 Com</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>Relay 2 N.C.</td>
<td>Relay 2 N.C.</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>Relay 2 N.O.</td>
<td>Relay 2 N.O.</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Not Used</td>
<td>Not Used</td>
<td></td>
</tr>
<tr>
<td>TB8 25</td>
<td>AC/Earth Gnd</td>
<td>AC/Earth Gnd</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>Not Used</td>
<td>Not Used</td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>AC Hot</td>
<td>AC Hot</td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>AC Neutral</td>
<td>AC Neutral</td>
<td></td>
</tr>
<tr>
<td>TB7 29</td>
<td>Digital 1 (no polarity)</td>
<td></td>
<td>Not Available</td>
</tr>
<tr>
<td>30</td>
<td>Digital 1 (no polarity)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>Digital 2 (no polarity)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>Digital 2 (no polarity)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Connection to 12-30 Volt In is also available on the bottom of TACHPAK 10 & 30. A special DIN rail power bus adapter is available as an accessory and works with the accessory power supply.
TACHPAK Enclosure Options

T77510-40 / T77530-40

Dimensions:
- 10.94 [278.0 mm]
- 10.00 [254.0 mm]
- 7.09 [180.0 mm]
- 7.40 [188.0 mm]
- 6.46 [164.0 mm]

Identification:
- 4X Ø.28 [7.1 mm]
- ENCLOSURE MTG HOLES

Cover opens 180°
TACHPAK Enclosure Options

T77510-70 / T77530-70

EXPLOSION PROOF
UL/CSA for hazardous locations
Class I, Groups B, C & D;
Class II, Groups E, F & G
Class III
also
Class I, Zone 1, Groups IIB + H2, IIA

ATEX
0102 Ex II 2 G EEx d IIC
For use in Zone 1,
Group IIC, Category 2 G,
IP66 hazardous locations

Certifications Inside Enclosure
(Consult Factory for Latest Update)
TACTHTROL® 10 & 30
Dual Input
Digital Tachometer
Part Number Series
T77610 & T77630
CE
RoHS

TACTHTROL 30 Key Features (T77630):

- Wide range of AC or DC power (12-30 Vdc, 80-264Vac 50-60Hz)
- Greatly improved instrument accuracy, processing speed and response time.
- Frequency, period or counter modes.
- User-defined inputs for logic level, averaging, alarm set points and hysteresis,
- Signal normalization and math functions allow mathematical manipulation of input signals. Results can be displayed along with user-defined units.
- Accepts sinusoidal and square wave inputs as found in variable reluctance and digital output speed sensors.
- Accepts bi-directional sensor inputs and will decode quadrature or direction signal logic
- 2 solid state relays (fast response time) and 2 mechanical relays (high power)
- Analog output: 0-20mA, 4-20mA, -20-0-(+) 20mA (can be used with bi-directional sensor)
- Two programming methods: Front panel on display or USB2.0 connectivity to PC / Windows-based TACHLINK.
- Utility RS485 communication allows full TACHLINK function over longer distances (up to 8000 ft)
- Drives up to 7 remote displays (TACTHTROL plus). A single display can be up to 1000 ft away with a simple RJ11 (phone jack) connection. Longer runs, cable type and number of displays will affect distance.
- Security mode protects unauthorized access for programming or alarm resets (through display or TACHLINK)
- Environmentally hardened for temperature, vibration and shock. EMC / CE compliant to current BS / EN directives.
- Has integrated display and will mount in same panel opening as TACTHTROL 3
- Display capabilities include two independent output channels for speed, count period or equation results, Alarm status / security, Mode, User defined units for each channel, 128x64 LCD graphics display with backlight.
- Designed and manufactured compliant with RoHS.

TACTHTROL 10 Key Features (T77610):

- Same as TACTHTROL 30 but excludes solid state relays, analog output and utility RS485

It is the customer’s responsibility to determine whether the product is proper for customer’s use and application.
Programming Features

Programming has been greatly simplified and can be accomplished by 2 different methods. Many configurable attributes have been added to improve flexibility and function.

- **Display front panel**: **TACTROL 10 and 30** can be programmed through the integrated display/membrane panel. Programming is accomplished by navigating through a series of nested menus. In the case of tachometer instruments embedded in explosion proof or NEMA 4X enclosures, remote access solves the problem of programming by making use of an IR link to allow full front panel control via a hand-held remote.

- **PC / Windows-based TACHLINK**: Custom software allows the user to program all configurable attributes of **TACTROL by PC** via a **USB2.0** or **RS485** connection. In addition, the **PC** can be used to display data, perform security functions, diagnostics, analog output calibration and real-time data logging; all available through the **TACHLINK**.

Applications:

- Fast response overspeed shutdown
- 2 Channel Speed/Draw Monitor
- Bi-directional Tachometer
- Reverse Rotation Alarm
- Low Speed Tachometer
- Clutch Slip Alarm
- Winder Control
- Ahead/Astern Marine Tachometer
- Expanded analog Scale Speed Transmitter
- Flow Rate Monitor
- Process Time Monitor
- Time per Event Monitor
- Autoranging Tachometer
- Computer Signal Conditioner
- Averaging Tachometer
- Line Frequency Monitor 60.00 Hz/400.0 Hz
- RS485 Speed Transmitter

<table>
<thead>
<tr>
<th>Ordering P/N</th>
<th>Input Power</th>
<th>Enclosure</th>
<th>Net Weight (lbs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>T77610-10</td>
<td>80-264 Vac/12-30 Vdc</td>
<td>Std. Panel Mount</td>
<td>0.8</td>
</tr>
<tr>
<td>T77610-40</td>
<td>80-264 Vac/12-30 Vdc</td>
<td>NEMA 4X</td>
<td>3.9</td>
</tr>
<tr>
<td>T77610-70</td>
<td>80-264 Vac/12-30 Vdc</td>
<td>Explosion Proof</td>
<td>42.0</td>
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<tr>
<td>T77630-10</td>
<td>80-264 Vac/12-30 Vdc</td>
<td>Std. Panel Mount</td>
<td>0.9</td>
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<td>T77630-40</td>
<td>80-264 Vac/12-30 Vdc</td>
<td>NEMA-4X</td>
<td>4.0</td>
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<tr>
<td>T77630-70</td>
<td>80-264 Vac/12-30 Vdc</td>
<td>Explosion Proof</td>
<td>42.0</td>
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</table>
### Table 2: Connection Information

<table>
<thead>
<tr>
<th>Terminal Block</th>
<th>Pin #</th>
<th>TACHTROL 30</th>
<th>TACHTROL 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remote Display</td>
<td>Use RJ11 type connector. See TB3 for individual breakout of pins.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>USB</td>
<td>Use USB “B” type connector. No individual breakout of pins.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RS485 DB9</td>
<td>1,5</td>
<td>GND</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Tx -</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Rx -</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>Tx +</td>
<td>Not Available</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>Rx +</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4,8,9</td>
<td>Not Used</td>
<td></td>
</tr>
</tbody>
</table>

### Table 3: Connection Information

<table>
<thead>
<tr>
<th>Terminal Block</th>
<th>Pin #</th>
<th>TACHTROL 30</th>
<th>TACHTROL 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>TB1</td>
<td>1</td>
<td>Relay 1 N.O.</td>
<td>Relay 1 N.O.</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Relay 1 Com</td>
<td>Relay 1 Com</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Relay 1 N.C.</td>
<td>Relay 1 N.C.</td>
</tr>
<tr>
<td>TB2</td>
<td>1</td>
<td>Relay 2 N.O.</td>
<td>Relay 2 N.O.</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Relay 2 Com</td>
<td>Relay 2 Com</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Relay 2 N.C.</td>
<td>Relay 2 N.C.</td>
</tr>
<tr>
<td>TB3 Remote Display</td>
<td>1</td>
<td>+12vdc Out</td>
<td>+12vdc Out</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Sig -</td>
<td>Sig -</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Sig +</td>
<td>Sig +</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Gnd</td>
<td>Gnd</td>
</tr>
<tr>
<td>TB4</td>
<td>1</td>
<td>AC/Earth Gnd</td>
<td>AC/Earth Gnd</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>AC/Earth Gnd</td>
<td>AC/Earth Gnd</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>AC Hot</td>
<td>AC Hot</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>AC Neutral</td>
<td>AC Neutral</td>
</tr>
<tr>
<td>TB5</td>
<td>1</td>
<td>Analog Shield</td>
<td>Not</td>
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<tr>
<td></td>
<td>2</td>
<td>Analog Out +</td>
<td>Available</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Analog Out -</td>
<td></td>
</tr>
<tr>
<td>TB6</td>
<td>1</td>
<td>Digital 1</td>
<td>Not</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Dig Com</td>
<td>Available</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Digital 2</td>
<td></td>
</tr>
<tr>
<td>TB7</td>
<td>1</td>
<td>12-30 Volt In</td>
<td>12-30 Volt In</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>In GND</td>
<td>In GND</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>+12 Vdc Out</td>
<td>+12 Vdc Out</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Out GND</td>
<td>Out GND</td>
</tr>
<tr>
<td>TB8</td>
<td>1</td>
<td>Verify -</td>
<td>Verify -</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Verify +</td>
<td>Verify +</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Reset -</td>
<td>Reset -</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Reset +</td>
<td>Reset +</td>
</tr>
<tr>
<td>TB9</td>
<td>1</td>
<td>Input Com</td>
<td>Input Com</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>A Sig</td>
<td>A Sig</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>B Sig</td>
<td>B Sig</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Direction Input</td>
<td>Direction Input</td>
</tr>
</tbody>
</table>
TACHTROL Enclosure Options

T77610-40
T77630-40

10.94 [278.0 mm]
10.00 [254.0 mm]

IDENTIFICATION

7.09 [180.0 mm]

7.40 [188.0 mm]
6.46 [164.0 mm]

4X Ø.28 [7.1 mm]
ENCLOSURE MTG HOLES

COVER OPENS 180°

NEMA 4X
TACHTROL Enclosure Options

T77610-70 / T77630-70

EXPLOSION PROOF
UL/CSA for Hazardous Locations
Class I, Groups B, C & D
Class II, Groups E, F & G
Class III
Also Class I, Zone 1, Groups IIB + H₂, IIA

ATEX
0102 EX II 2 G
For use in Zone 1 Groups
I IA, IIB & IIB+H₂ T6 or T5,
IP66 hazardous locations

Certifications Inside Enclosure
(Consult Factory for Latest Update)
TACHTROL® plus
Digital Remote Display
Part Number Series
T77810

TACHTROL plus:

- An extension of the TACHPAK and TACHTROL lines. While this device has no intrinsic tachometer function, it forms a network with TACHPAK 10 & 30 and TACHTROL 10 & 30 and can be used as a remote display or programming pendant.
- Serves as a gateway with both TACHPAK and TACHTROL instruments for secure, remote programming and alarm reset.
- Front panel operation and display is identical to TACHTROL 10 & 30
- Each display can be configured to display individual combinations of Channel A, B and Equation.
- Security can be applied to prevent unwanted access in remote locations.
- Acts as a hub for multiplexing up to seven additional displays with a single tachnometer up to 125 feet away using an RJ11 (1:1) type phone cord.
- No external power connection. Connect only to approved TACHTROL and TACHPAK products.

<table>
<thead>
<tr>
<th>Ordering P/N</th>
<th>Enclosure</th>
<th>Net Weight (lbs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>T77810-10</td>
<td>Std. Panel Mount</td>
<td>0.6</td>
</tr>
<tr>
<td>T77810-40</td>
<td>NEMA 4X</td>
<td>3.7</td>
</tr>
<tr>
<td>T77810-70</td>
<td>Explosion Proof</td>
<td>42.0</td>
</tr>
</tbody>
</table>

It is the customer’s responsibility to determine whether the product is proper for customer’s use and application.
PANEL MOUNT STANDARD ENCLOSURE

REAR VIEW - CONNECTIONS

<table>
<thead>
<tr>
<th>Terminal Block</th>
<th>Pin #</th>
<th>TACHTROL plus</th>
</tr>
</thead>
<tbody>
<tr>
<td>TB1 Remote Display</td>
<td>1</td>
<td>+12vdc In</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Sig +</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Sig -</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Gnd</td>
</tr>
<tr>
<td>Remote Display</td>
<td>Use RJ11 type connector. See TB1 for individual breakout of pins.</td>
<td></td>
</tr>
</tbody>
</table>
TACTROL plus Enclosure Options:

T77810-40

10.94 [278.0 mm]
10.00 [254.0 mm]
7.09 [180.0 mm]

7.40 [188.0 mm]
6.46 [164.0 mm]

4X Ø 28 [7.1 mm]
ENCLOSURE MTG HOLES

IDENTIFICATION

COVER OPENS 180°

NEMA 4X
TACHTROL plus Enclosure Options
T77810-70

EXPLOSION PROOF
UL/CSA for Hazardous Locations
Class I, Groups B, C & D
Class II, Groups E, F & G
Class III
Also Class I, Zone 1, Groups IIB + H2, IIA

ATEX
0102 EX II 2 G
For use in Zone 1 Groups
IIB, IIB + H2 T6 or T5,
IP66 hazardous locations

Certifications Inside Enclosure
(Consult Factory For Latest Update)
NEW GENERATION TACHOMETER ACCESSORIES
RoHS

REMOTE
P/N: T776/8 - REMOTE
Used with all TACHTROL 10 & 30 & plus Devices
Net weight: 0.15 lbs

Optional, Power Supply Kit with T-Bus Connector
P/N: T775/6-PWR SPLY
Optional use with all TACHPAK 10 & 30 & TACHTROL 10 & 30 when more supply power required.
Rating: 100-240 VAC/24 VDC/1.5A
Net weight: 1 lb.
NEW GENERATION TACHOMETER ACCESSORIES
RoHS

**TACTROL-TO-DIN RAIL MOUNTING KIT**

P/N: 675-0300-001

Used with all **TACTROL 10 & 30 & plus**

(35 Din Rail not included)

Net weight: 0.25 lbs

**Overall Depth = 5.75 inches**

<table>
<thead>
<tr>
<th>ITEM</th>
<th>QTY</th>
<th>PARTNUMBER</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>150-0201-001</td>
<td>PLATE</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
<td>196-0202-002</td>
<td>SPACER, NYLON</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>186-0206-001</td>
<td>SCREW, TAPPING #8 X 2.5:, SST</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>227-0301-002</td>
<td>WASHER, #8, INTERNAL TOOTH LOCK</td>
</tr>
<tr>
<td>5</td>
<td>2</td>
<td>020-0310-001</td>
<td>BRACKET, DIN RAIL CLIP</td>
</tr>
<tr>
<td>6</td>
<td>4</td>
<td>186-0209-001</td>
<td>SCREW, SHEET METAL #4-40</td>
</tr>
</tbody>
</table>
**TACHTROL® 20:**

The newest member of the *AI-TEK* Tachometer family.

The *TACHTROL® 20* is a single input digital instrument designed to provide the versatility and flexibility needed to accommodate virtually any rate measuring application. Configurable to display application-specific rate information in raw frequency or engineering units such as RPM or FPM.

The *TACHTROL® 20* can accommodate magnetic pickups, logic sensors, and NPN open collector sensors. The pulses are received and scaled so the desired display can be achieved. The meter is programmed through both the front panel buttons and DIP switches. Once the programming is complete, the front panel buttons can be disabled by a DIP switch setting.

The meter has been specifically designed for harsh industrial environments. With NEMA 4X/IP65 sealed bezel and extensive testing to meet CE requirements, the meter provides a tough, yet reliable application solution.

**FEATURES AND ADVANTAGES:**

- Single-channel precision speed or rate monitoring
- Field adjustable scaling
- Bright six-digit LED display
- Wide frequency range 0.1 to 25 kHz
- Active or passive sensor input
- Panel Mount 1/8 DIN standard housing
- Fast response
- Low cost
- Easy set-up
- High precision
- Operating temperature range 0° to 60° C
- AC power: 115 / 230 volts selectable
- DC power: 10-16 volts at 0.1A max

*It is the customer’s responsibility to determine whether the product is proper for customer’s use and application.*
DIMENSIONS In inches (mm)
Note: Recommended minimum clearance (behind the panel) for mounting clip installation is 2.1" (53.4) H X 5" (127) W.

PANEL MOUNT STANDARD ENCLOSURE

3.1 POWER WIRING
AC Power
Terminal 1: VAC
Terminal 2: VAC

DC Power
Terminal 3: +VDC
Terminal 4: COMM

3.2 INPUT WIRING

Magnetic Pickup

AC Inputs From Tach Generators, Etc.

Two Wire Proximity, Current Source

Current Sinking Output

Current Sourcing Output

Interfacing With TTL

Emitter Follower; Current Source

SAFETY SUMMARY
All safety related regulations, local codes and instructions that appear in the literature or on equipment must be observed to ensure personal safety and to prevent damage to either the instrument or equipment connected to it. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

CAUTION: Risk of Danger.
Read complete instructions prior to installation and operation of the unit.

CAUTION: Risk of electric shock.
TACHTROL® 20 Panel Mount Adapter Installation Instructions

1. Apply the panel gasket (*supplied with Tachometer*) over the TACHTROL® 20 meter.
2. Insert the TACHTROL® 20 meter through the mounting plate.
3. Apply the panel gasket (*supplied with the adapter kit*) over the TACHTROL® 20 meter behind the mounting plate.
4. Insert the TACHTROL® 20 meter with mounting plate and gaskets into the front of the existing Tachrol 2 meter hole cut-out. Slide the adapter plate over the rear of the TACHTROL® 20 meter.
5. Slide the panel latch (*supplied with the Tachometer*) over the rear of the TACHTROL® 20 meter and tighten the screws.

TACHTROL® 20 PANEL MOUNT ADAPTER — P/N: 675-0303-001
Target / Speed Variables Conversion

\[
\begin{align*}
  f &= \frac{RPM}{60} \times PPR = \frac{SS \times PPR}{\pi \times D} = \text{UPM} \times \frac{PPU}{60} = \frac{UPH}{3600} \times PPU \\
  SS &= \frac{RPM}{60} \times \pi \times D = \frac{f \times \pi \times D}{PPR} \\
  RPM &= \frac{60 \times f}{PPR} = \frac{60 \times SS}{\pi \times D} \\
  D &= \frac{(PPR + 2)}{DP} = \frac{SS \times PPR}{f \times \pi} \\
  DP &= \frac{(PPR + 2)}{D} = \frac{25.4}{M} \\
  CP &= \frac{\pi}{DP} = \frac{\pi \times PD}{PPR} \\
  PD &= \frac{PPR}{DP} = \frac{CP \times PPR}{\pi} \\
  M &= \frac{25.4}{DP} = \frac{25.4 \times D}{(PPR+2)} \\
  PPR &= \frac{(D \times DP) - 2}{RPM} = \frac{60 \times f}{SS} = \frac{f \times \pi \times D}{SS}
\end{align*}
\]

Definitions:

\[
\begin{align*}
  f &= \text{frequency in Hz or cycles per second (cps)} \\
  SS &= \text{surface speed in inches per second (ips)} \\
  RPM &= \text{rotary speed in revolutions per minute} \\
  PPR &= \text{pulses per revolution or number of gear teeth} \\
  D &= \text{outside diameter of target (gear) in inches} \\
  PD &= \text{pitch diameter of target (gear) in inches} \\
  \pi &= \text{3.14} \\
  UPM &= \text{unit measure per minute} \\
  UPH &= \text{unit measure per hour} \\
  PPU &= \text{pulses per unit measure} \\
  DP &= \text{diametral pitch = number of teeth in 1 inch pitch diameter} \\
  CP &= \text{circular pitch = arc distance between teeth on pitch circle} \\
  M &= \text{metric module = pitch diameter in mm divided by number of gear teeth}
\end{align*}
\]